

symbol streams 110, to be eventually combined with other parallel streams or code matrices in code construction module 106.

**IN THE CLAIMS:**

Please amend claims 31-39, 41, 42, 44 and 48-59 as follows. Please cancel claims 60-72. Please add new claims 73-75 as shown below.

Claims 1-30. (Cancelled)

31. (Currently Amended) A method of transmitting complex symbols using a transmission code matrix, said method comprising:

- constructing said transmission code matrix, ~~wherein each of said complex symbols forms part of at least two elements of said transmission code matrix and wherein at least some of said matrix elements are formed by linearly mixing at least two of said complex symbols; and~~

- transmitting said transmission code matrix, at least partially in parallel, using substantially orthogonal signalling resources and at least three different transmit antenna paths,

wherein said transmission code matrix can be expressed as being constructed using at least two transformed transmit diversity code matrices,

wherein said transformed transmit diversity code matrices can be expressed as being constructed by transforming at least two code matrices using linear transformations, and

wherein said transmit diversity code matrices, at least one of which is of dimension greater than one, can be expressed as being formed by modulating at least two at least partially different streams of complex symbols that are obtainable from a single stream of complex symbols by conversion.

32. (Currently Amended) The method of Claim 31, wherein constructing said transmission code matrix comprises:

- converting a stream of complex symbols to at least two at least partially different streams of complex symbols;
- modulating said at least two streams of complex symbols to form at least two transmit diversity code matrices, at least one of which is of dimension greater than one;
- transforming said transmit diversity code matrices using linear transformations, to construct at least two transformed transmit diversity code matrices; and
- constructing a transmission code matrix using at least two transformed transmit diversity code matrices.

33. (Currently Amended) The method of Claim ~~32~~ 31, wherein at least one of the linear transformations is different from an identity transformation.

34. (Currently Amended) The method of Claim-~~32~~ 31, wherein the at least two transmit diversity code matrices are orthogonal transmit diversity code matrices.

35. (Currently Amended) The method of Claim-~~32~~ 31, wherein both the matrix dimensions of the transmission code matrix are greater than the corresponding matrix dimensions of the transformed transmit diversity code matrices.

36. (Currently Amended) The method of Claim 35, wherein the transmission code matrix can be expressed as being ~~is~~-constructed from the transformed transmit diversity code matrices using the method of embedding a lower-dimensional matrix into a higher-dimensional one.

37. (Currently Amended) The method of Claim-~~32~~ 31, wherein the transmission code matrix can be expressed as being ~~is~~-constructed from the transformed transmit diversity code matrices using at least one of the methods of repetition, negation, conjugation, permutation, multiplying with a matrix.

38. (Currently Amended) The method of Claim-~~32~~ 31, wherein the first transformed transmit diversity code matrix can be expressed as being ~~is~~-constructed by summing two transmit diversity code matrices, and the at least the second transformed

transmit diversity code matrix can be expressed as being ~~is constructed~~ by subtracting the said two transmit diversity code matrices.

39. (Currently Amended) The method of ~~in~~ Claim 34, wherein the symbol rate of the transmission code matrix is the same as ~~the~~ an average symbol rate of the orthogonal transmit diversity code matrices to which the linear transformations are applied.

40. (Previously Presented) The method of Claim 31, wherein the transmission code matrix extends over T substantially orthogonal signaling resources, and wherein more than T complex symbols are used to construct the transmission code matrix.

41. (Currently Amended) The method of Claim ~~32~~ 31, wherein said conversion comprises the step of constructing the at least two streams of complex symbols contains a serial-to-parallel conversion.

42. (Currently Amended) The method of Claim ~~32~~ 31, wherein said conversion comprises the step of constructing the at least two streams of complex symbols contains a rotation unit.

43. (Previously Presented) The method of Claim 42, wherein the rotation unit is a symbol rotation matrix that differs from an identity matrix, and contains at least two zero-elements.

44. (Currently Amended) The method of Claim 42, wherein the rotation unit is a symbol rotation matrix that is formed as ~~Kroneker~~Kronecker product of two unitary matrices, where at least one is different from an identity matrix.

45. (Previously Presented) The method of Claim 43, wherein the symbol rotation matrix is a diagonal matrix, where at least one diagonal element is a complex number.

46. (Previously Presented) The method of Claim 40, wherein at least two transformed transmit diversity code matrices are transmitted in parallel, and wherein the two transformed transmit diversity code matrices contain at least partially different symbols.

47. (Previously Presented) The method of Claim 40, wherein a part of the symbols are transmitted on a block-diagonal sub-matrix within the transmission code matrix, and at least partly different symbols are transmitted on an anti-block-diagonal sub-matrix within the transmission code matrix.

48. (Currently Amended) The method of Claim 40, wherein there are four substreams and wherein each substream is modulated to form an orthogonal 2 x 2 transmit diversity code matrix incorporating two complex symbols, and wherein the transmission code matrix extends over at least four substantially orthogonal signaling resources.

49. (Currently Amended) The method of Claim ~~32~~31, wherein at least one transmit diversity code matrix has a different symbol rate than another transmit diversity code matrix.

50. (Currently Amended) The method of Claim ~~32~~31, wherein at least one transmit diversity code matrix has different dimensions than another transmit diversity code matrix.

51. (Currently Amended) The method of Claim ~~32~~31, wherein at least one transmit diversity code matrix is transmitted with different power than another transmit diversity code matrix.

52. (Currently Amended) The method of Claim ~~32~~31, wherein the substantially orthogonal signaling resources include at least one of the following: non-overlapping

time slots, different spreading codes, different OFDM subcarriers, different wavelet waveforms and different FDMA channels.

53. (Currently Amended) An apparatus for transmitting complex symbols using a transmission code matrix, said apparatus comprising:

- components which are configured ~~adapted~~ to construct a transmission code matrix out of complex symbols, ~~wherein each of said complex symbols forms part of at least two elements of said transmission code matrix and wherein at least some of said matrix elements are formed by linearly mixing at least two of said complex symbols; and~~

- a transmission unit configured ~~means adapted~~ to transmit said transmission code matrix, at least partially in parallel, using substantially orthogonal signalling resources and at least three different transmit antenna paths

wherein said transmission code matrix can be expressed as being constructed using at least two transformed transmit diversity code matrices,

wherein said transformed transmit diversity code matrices can be expressed as being constructed by transforming at least two transmit diversity code matrices using linear transformations, and

wherein said transmit diversity code matrices, at least one of which is of dimension greater than one, can be expressed as being formed by modulating at least two at least partially different streams of complex symbols that are obtainable from a single stream of complex symbols by conversion.



54. (Currently Amended) The apparatus of Claim 53, wherein said components ~~configured adapted~~ to construct a transmission code matrix comprise:

- ~~a conversion unit configured to convert means for converting~~ a stream of complex symbols to at least two at least partially different streams of complex symbols;
- ~~a modulating unit configured to modulate means for modulating~~ said at least two streams of complex symbols to form at least two transmit diversity code matrices, at least one of which is of dimension greater than one;
- ~~a transforming unit configured to transform means for transforming~~ said transmit diversity code matrices using linear transformations, to construct at least two transformed transmit diversity code matrices; and
- ~~a code constructing unit configured to construct means for constructing~~ a transmission code matrix using at least two transformed transmit diversity code matrices.

55. (Currently Amended) The apparatus of Claim 54, wherein ~~the transforming means applies~~ at least one of the linear transformations is different from an identity transformation

56. (Currently Amended) The apparatus of Claim 54, wherein ~~the modulating means forms~~ the at least two transmit diversity code matrices are orthogonal code matrices.

57. (Currently Amended) A system comprising a transmitter for transmitting complex symbols using a transmission code matrix, and a receiver for receiving transmitted complex symbols, said transmitter comprising:

- components configured ~~which are adapted~~ to construct a transmission code matrix out of complex symbols, ~~wherein each of said complex symbols forms part of at least two elements of said transmission code matrix and wherein at least some of said matrix elements are formed by linearly mixing at least two of said complex symbols;~~ and

- a transmission unit configured ~~means adapted~~ to transmit said transmission code matrix, at least partially in parallel, using substantially orthogonal signalling resources and at least three different transmit antenna paths,

wherein said transmission code matrix can be expressed as being constructed using at least two transformed transmit diversity code matrices,

wherein said transformed transmit diversity code matrices can be expressed as being constructed by transforming at least two transmit diversity code matrices using linear transformations, and

wherein said transmit diversity code matrices, at least one of which is of dimension greater than one, can be expressed as being formed by modulating at least two at least partially different streams of complex symbols that are obtainable from a single stream of complex symbols by conversion.

58. (Currently Amended) A transmission code matrix, which is to be transmitted at least partially in parallel on at least three different transmit antenna paths using substantially orthogonal signalling resources,

wherein said transmission code matrix can be expressed as being constructed using at least two transformed transmit diversity code matrices,

wherein said transformed transmit diversity code matrices can be expressed as being constructed by transforming at least two transmit diversity code matrices using linear transformations, and

wherein said transmit diversity code matrices, at least one of which is of dimension greater than one, can be expressed as being formed by modulating at least two at least partially different streams of complex symbols that are obtainable from a single stream of complex symbols by conversion~~based on complex symbols which are to be transmitted, wherein each of said complex symbols forms part of at least two elements of said transmission code matrix and wherein at least some elements of said transmission code matrix comprise a linear mixture of at least two of said complex symbols.~~

59. (Currently Amended) The transmission code matrix of claim 58, wherein said ~~complex symbols are four complex symbols and wherein said transmission code matrix comprises 4x4 elements~~ can be expressed as being constructed using two transformed transmit diversity code matrices residing on the block-diagonal of said transmission code matrix,

wherein one of said transformed transmit diversity code matrices can be expressed as being constructed as a sum of two transmit diversity code matrices, and wherein the other transformed transmit diversity code matrix can be expressed as being constructed as a difference of said two transmit diversity code matrices.

and wherein said two transmit diversity code matrices can be expressed as being formed by modulating two different streams of complex symbols that are obtainable from a single stream of complex symbols.

60-72. (Cancelled )

73. (New) The method of Claim 31, wherein said transmission code matrix can be expressed as being constructed using two transformed transmit diversity code matrices residing on the block-diagonal of said transmission code matrix,

wherein one of said transformed transmit diversity code matrices can be expressed as being constructed as a sum of two transmit diversity code matrices, and wherein the other transformed transmit diversity code matrix can be expressed as being constructed as a difference of said two transmit diversity code matrices,

and wherein said two transmit diversity code matrices can be expressed as being formed by modulating two different streams of complex symbols that are obtainable from a single stream of complex symbols.

74. (New) The apparatus of Claim 53, wherein said transmission code matrix can be expressed as being constructed using two transformed transmit diversity code matrices residing on the block-diagonal of said transmission code matrix,

wherein one of said transformed transmit diversity code matrices can be expressed as being constructed as a sum of two transmit diversity code matrices, and wherein the other transformed transmit diversity code matrix can be expressed as being constructed as a difference of said two transmit diversity code matrices,

and wherein said two transmit diversity code matrices can be expressed as being formed by modulating two different streams of complex symbols that are obtainable from a single stream of complex symbols.

75. (New) The system of Claim 57, wherein said transmission code matrix can be expressed as being constructed using two transformed transmit diversity code matrices residing on the block-diagonal of said transmission code matrix,

wherein one of said transformed transmit diversity code matrices can be expressed as being constructed as a sum of two transmit diversity code matrices, and wherein the other transformed transmit diversity code matrix can be expressed as being constructed as a difference of said two transmit diversity code matrices,

and wherein said two transmit diversity code matrices can be expressed as being formed by modulating two different streams of complex symbols that are obtainable from a single stream of complex symbols.